Assessment of the Vitamin A Situation in Rwanda

April 21 – May 2, 2003

Jean Shaikh
Lina Mahy

DRAFT

This publication was made possible through support provided by the Center for Population, Health and Nutrition of the Bureau for Global Programs, Field Support and Research of the U.S. Agency for International Development (USAID).

MOST is managed by the International Science and Technology Institute, Inc. (ISTI) under the terms of Cooperative Agreement No. HRN-A-00-98-0047-00. Partners are the Academy for Educational Development (AED), Helen Keller International (HKI), the International Food Policy Research Institute (IFPRI), and Johns Hopkins University (JHU). Resource institutions are CARE, the International Executive Service Corps (IESC), Population Services International (PSI), Program for Appropriate Technology in Health (PATH), and Save the Children.

The MOST Project
1820 N. Fort Myer Drive, Suite 600
Arlington, VA 22209 USA
Telephone: (703) 807-0236 Fax: (703) 807-0278
Web site: http://www.mostproject.org
E-mail: most@istiinc.com

Table of Contents

Executive Summary .....

1. Introduction 1
   1.1 Background 1
   1.2 Purpose 1
   1.3 Scope of Work 2
   1.4 Methodology 2

2. Findings 3
   2.1 Vitamin A Deficiency 3
   2.2 Vitamin A Policies and Programs 3
   2.3 The Health Sector 7
   2.4 Related Sectors 10
   2.5 Contextual Issues 11

3. Conclusions 12

4. Recommendations 14

5. Implementation Issues and Next Steps 18

Appendix A: Scope of Work .....
Appendix B: Persons Contacted .....
Appendix C: Summary of May 2, 2003 Workshop .....
Appendix D: Exhibits: Monitoring and Evaluation Forms .....
   1. Un cadre pour le suivi des facteurs qui influencent la couverture .....
   2. Republique du Niger, Ministere de la Sante Publique: Distribution des capsules de vitamine A .....
   3. Republique du Niger, Ministere de la Sante Publique: Fiche de seances des consultations pre et post natales .....
   4. Republique du Niger, Ministere de la Sante Publique: Fiche d'auto-evaluation .....
   5. Republique du Niger, Ministere de la Sante Publique: Activities du Programme Elargi de Vaccination: Rapport timestriel de vaccination du District Sanitaire .....
   6. Burkina Faso, Ministere de la Sante: Fiche Infantile .....
   7. Burkina Faso, Ministere de la Sante:Carte de vaccination .....
   8. Burkina Faso, Ministere de la Sante: Carnet de Sante .....
Appendix E: Exhibits: Training Materials .....
   1. L'integration de la vitamine A aux vaccinations: Activities de formation .....
   2. Questions et reponses sur la vitamine A: Activities de formation .....
   3. Questions et reponses sur la vitamine A: Feuille de reference .....
   4. Le traitement des enfants malades: Activities de formation .....
   5. Le traitement des enfants malades: Feuille de reference A .....
   6. Le traitement des enfants malades: Feuille de reference B .....
   7. Le traitement des enfants malades: Feuille de reference C .....
   8. Le traitement des enfants malades: Feuille de reference D .....

9. La mobilisation sociale: Activites de formation .....
10. La mobilisation sociale: Feuille de reference .....
11. Le calcul de la couverture: Activites de formation .....
12. Le calcul de la couverture: Feuille de reference .....
13. La liste de supervision: Activites de formation .....
14. La liste de supervision: Feuille de reference.....
15. La tenue des registres: Activites de formation.....
16. La tenue des registres: Feuille de reference.....
17. Bulletin d'information sur la supplementation en vitamine A en Cote d'Ivoire a l'intention des aents de sants communautaires.....
18. Helen Keller International: Module de formation des cadres techniques du Niger en nutrition et techniques de communication. Micro nutriments: vitamine A, fer, iode....
Appendix F: Fiche technique sur la patate douce .....

Executive Summary

To be completed after approval of the draft report

1. Introduction

1.1 Background

Rwanda is among the poorest countries in the world, with a GNP of $210 in 1997 (reduced from $270 in 1983). As many of the social indicators presented in Table 1 show, the country suffered immensely during the 1994 war and genocide. Not only was the country's infrastructure completely destroyed, but also its human resources were significantly reduced. The country is still in a post-war rebuilding phase: aid agencies are only as of recently transferring from emergency projects into long term development projects; the government, with help from its partners, is investing in the education of a new generation of managers; and new government policies are being drafted or existing ones revised.

Table 1: Social indicators of Rwanda[1]

	1970 or eighties*	1998
Life expectancy	47 years	41 years
Debt service as % of exports of goods and services	1%	10%
% of population living under the poverty line	40% in 1985	70%
Under five mortality rate	233*	196
Infant mortality rate	107*	107
Maternal Mortality rate	611*	1071
Contraceptive use[2]	25% in 1992	18% in 2000

Rwanda is facing a multitude of problems, among others:

- Shortage of land (66% of households cultivate on less than one hectare of land[3]);
- Rapid population growth (although, because of the genocide, annual population growth between 1990 and 1998 was –0.7, the fertility rate is still very high, 6.1 in 1998) and high population density (250 inhabitants/km²);
- Geographical isolation and instability in neighboring countries (Burundi, Democratic Republic of Congo);
- Lack of industrial activity, overall subsistence agriculture and collapse of coffee prices, a cash crop cultivated by farmers;
- High prevalence of HIV/AIDS (11% of the population).

1.2 Purpose

The purpose of this assessment was to better understand the current situation in Rwanda in relation to vitamin A supplementation in order to develop appropriate strategies to reduce vitamin A deficiency in children and women. Its outputs will serve as one input to the devel-

opment of a national vitamin A strategy, the next step of which will be a national strategy development workshop.

1.3 Scope of Work

Specifically, the scope of work was:

- To evaluate vitamin A interventions developed in the field, either isolated or in relation with other health and community programs;
- To assess opportunities and constraints related to the in-country vitamin A supplementation;
- To assess the main key activities to be developed for an efficient vitamin A supplementation;
- To identify the key partners involved or to be involved in the supplementation of vitamin A at national and district level and the role each can play;
- To make recommendations to government and support agencies for vitamin A supplementation policy development and interventions which might improve the situation.

1.4 Methodology

The assessment used a participatory methodology comprising:

- A review of key literature
- Open-ended key information interviews with numerous interested parties including: government staff at the Ministry of Health and other related ministries at the national level; local Ministry of Health staff at provincial and district levels; representatives of relevant donor agencies; and staff of various non-governmental implementing agencies
- Field visits
- Two stakeholder workshops

2. Findings

2.1 Vitamin A Deficiency

Rwanda has one of the highest levels of infant and child mortality in Africa (107 and 197 per 1,000 live births respectively). These high rates are largely attributable to malaria, acute respiratory infections, and diarrhea, many of which area worsened by vitamin A deficiency. In line with current recommendations - that any country with an under-five mortality rate of 70 per 1,000 or more should assume that vitamin A deficiency (VAD) is a public health problem unless conclusive evidence to the contrary exists - it is reasonable to assume that Rwanda has a vitamin A deficiency (VAD) problem of public health significance.[4]

According to the Demographic and Health Survey (DHS) of 2000, 7 percent of all women giving birth in the preceding five years reported some form of night blindness during their last pregnancy[5]. This finding may indicate the existence of a public health problem, since a rate of 5 percent is generally considered an indicator of VAD in the wider population.[6]

The Rwandan diet is characterized by very low consumption of the more bio-available sources of vitamin A:

- 37% of the daily energy supply derives from the consumption of tubers and roots (sweet potatoes, cassava, bananas);
- 17% of the daily dietary energy supply derives from the consumption of legumes;
- less than 3% of the daily dietary energy supply derives from the consumption of food of animal origin; and
- consumption of lipids is very low[7].

Most Rwandan households consume sweet potatoes (87% of households) and beans (78.4% of households) on a daily basis. Other staple foods consumed are bananas, cassava (26% of households) and Irish potatoes (18% of households). Vegetables are consumed by 40% of households, while fruits and meat are rarely eaten.

Breastfeeding is a very common practice in Rwanda. Ninety-seven percent of children are breastfed, a figure that has not changed since the DHS of 1992[8]. Rwandan children are breastfed for almost three years (median period: 32.6 months). Exclusive breastfeeding is widely practiced. Eighty-four percent of children under 6 months are exclusively breastfed, according to the DHS of 2000. Complementary feeding is introduced at age 6 to 7 months for 66 percent of children in that age group. However, at that age only 28 percent of children receive foods rich in vitamin A.

2.2 Vitamin A Policies and Programs

2.2.1 Policies

Rwanda has adopted the recommendations of the World Summit for Children (1990), the International Conference on Hunger (1991) and the International Conference on Nutrition (1992)[9], one of the recommendations being the virtual elimination of Vitamin A deficiency. In November 1995, the Rwandan Government drafted a comprehensive national nutrition policy and plan of action in collaboration with the World Health Organization (WHO). Although this document has never been officially adopted and now needs to be revised[10], it sets as an objective the virtual elimination of vitamin A deficiency by the year 2000 and specifies as strategies the distribution (short-term) of vitamin A supplements in at-risk zones and the promotion of vitamin A-rich foods. Beyond this, however, Rwanda has not had any officially adopted policies or program concerning the control of Vitamin A deficiency.

The only existing official guideline on vitamin A supplementation is a directive issued by the Nutrition Division of the Ministry of Health (MOH) in DATE?, recommending distribution of capsules through the routine system to all children 6 to 59 months every 4 months and distribution of a single dose to post partum women within two months after delivery.

2.2.2 Programs

Preventive Supplementation of Children 6-59 Months

From 1998 to 2000 Rwanda took advantage of the National Immunization Days against polio to distribute vitamin A capsules to children 6 to 59 months. UNICEF was the main partner advocating and supporting these vitamin A activities.

According to MOH data[11], vaccination coverage was high (Table 2).

Table 2: NIDs Immunization Coverage

Immunization Coverage (% children vaccinated against polio through NIDs)	**1996**	**1997**	**1998**	**1999**	**2000**
	58	74	90 + VA	105+ VA	100+ VA

Vitamin A coverage was also relatively high during this period. The 2000 Demographic and Health Survey (DHS) reported that 69 percent of children under five had received a vitamin A dose in the six months preceding the survey, with region-specific rates varying from a low of 42 percent in Kigali Rural to a high of 84 percent in Butare, Kibuye and Ruhengeri. An issue of special concern was the low coverage in the Kigali area, 48.2 percent in Kigali town and 42 percent in Rural Kigali. This finding was confirmed by the Multiple Indicators Coverage Survey (MICS) of 2001 (Table 3).

Table 3: Vitamin A Capsule Distribution Coverage

Vitamin A Capsule Coverage (% children receiving a capsule in last 6 months)	**National**	**Urban**	**Rural**	**Kigali Town**
	59.7	36.7	61.3	17.7

Since the end of NIDS, vitamin A supplementation of children has only been sporadic. During 2001 and 2002, vitamin A capsules were distributed during some of the sub-NIDS organized AGAINST POLIO OR MEASLES? In February 2003 a national measles immunization campaign was conducted for children 9 months to 15 years. Although about three million vitamin A capsules were available, their expiration date was the same month, and the Government declined to have them distributed. The next measles vaccination campaign, to be organized in three to five years, will include vitamin A capsule distribution.

Despite the Ministry of Health's mandate, vitamin A supplementation through the routine health system occurs infrequently and almost entirely in the context of well-child visits for immunization. Perhaps for this reason, some health centers are not adhering to the Ministry of Health's recommended dosing schedule, particularly in relation to the timing of the first dose, which is sometimes being given at 9 months (with measles immunization) rather than at 6 months. Lack of adherence to the recommended dosing schedule may also be due to the fact that the Ministry revised its recommendation regarding the age at first dose from 9 to 6 months relatively recently.

Programme de Nutrition à Base Communautaire (PNBC)

In 1997, Rwanda started the PNBC, a national community-based nutrition program, in a limited number of pilot sites. Currently, the program is implemented in 15 of the country's 39 health districts. Non-governmental organizations (NGOs), such as the International Rescue Committee (IRC), World Relief, Save the Children and Concern, implement the PNBC, as do a number of faith-based organizations. UNICEF is a strong supporter (provides supplies), and the World Food Program is interested in participating in the PNBC program as it is scaled up. The general objective of the PNBC is to improve the food and nutrition situation of under-five children and pregnant and breastfeeding women through the involvement and empowerment of the community[12]. Specific objectives are to:

- Reduce by 30% the prevalence of chronic malnutrition in under-five children in the areas of the PNBC;
- Reduce by one third the prevalence of iron deficiency and to eliminate vitamin A and iodine deficiency in women of child bearing age and under-five children ; and
- Reduce by 30% the prevalence of malnutrition in women of child bearing age.

Although each implementer operates the program in a somewhat different way, PNBC is intended as an integrated program, consisting of monthly sessions involving nutrition, health and environmental interventions. The entry point of the PNBC and its most developed intervention is growth monitoring and promotion. Although micronutrient interventions (e.g. the distribution of iron and vitamin A) are included, these have only recently begun to be imple-

mented in some districts supported by NGOs and in which faith-based organizations are active. Although one NGO, Save the Children – UK is reconsidering continuation of its growth monitoring programs, including in Rwanda, based on a review of three World Bank-funded growth monitoring and promotion projects[13], some faith-based organizations are report achieving more than 70 percent coverage for monthly sessions.

The PNBC relies heavily on the commitment and motivation of nutrition committees and community nutrition volunteers. There are three volunteers per site who need to respond to a certain number of criteria (ability to read and write, credibility in the community, residence in the community, etc.).

Current results of the distribution of vitamin A capsules through the PNBC, as reported by the implementing NGOs, are reported as the absolute number of children 6 to 59 months that received a capsule during the month. Since distribution is done "on demand" and "every 4 months", it is very difficult to estimate the target population for the month in question, a statistic needed to determine coverage.

Preventive Supplementation of Post-Partum Women

National coverage of post partum mothers with a single dose of vitamin A given within two months of delivery is much lower: 31.6% (MICS2001) and 13.9% (DHS2000). Again coverage is reported to be lowest in Kigali town (11.1%).

Food Fortification

There are no national laws or decrees concerning the fortification of foods with vitamin A, although some fortified foods, such as margarine, are available on the market. The World Food Programme (WFP) distributes vitamin A fortified vegetable oil and CSB flour to its target groups.

Dietary Diversification

From 1996 to 1999, the Institut des Sciences Agronomiques (ISAR), in collaboration with UNICEF and the Ministry of Health, implemented a pilot project to promote the production and consumption of micronutrient rich local foods, such as spinach, carrots, and celery. Seed production was carried out at the ISAR Center in Rubona. Nutrition education and the distribution of seeds were carried out at the nutritional center of Busoro. Among ISAR's conclusions is that lack of demand is the biggest constraint to the expansion of improved varieties of foods.

2.2.3 Vitamin A Support Systems

Vitamin A Supply Logistics

Vitamin A capsules are currently supplied to the Nutrition Division by the Canadian International Development Agency (CIDA), through UNICEF. Health Districts and NGOs requisition capsules directly from the Nutrition Division (Figure 2).[14]

Figure 2: Flow Chart for Vitamin A Capsule Supply

CIDA → UNICEF→ MOH Nutrition Division → Health District → Health Centre → Community

Stock-outs of vitamin A have characterized most health facilities for about a year, due largely to unaddressed problems in the vitamin A monitoring system which requires provision of monthly vitamin A utilization data as backup to vitamin A requisitions.

Vitamin A Monitoring and Evaluation

Health system monitoring forms include vitamin A indicators (absolute number of children receiving vitamin A). Vitamin A requisition forms have been developed. Individual child health cards provide for the recording of vitamin A supplementation. It appears, however, that information on vitamin A supplementation is rarely recorded on the card, perhaps because of health worker confusion caused by the design of this portion of the card (which has what might appear to be pre-recorded entries at month 6 and every four months thereafter).

2.3 The Health Sector

2.3.1 Organization of the Sector

The health system in Rwanda consists of 3 distinct sectors: the Government-supported sector, the faith-based sector, and the private health sector.

The Governmental health system structure has three levels: the central level; the intermediate level, comprised of 12 health regions; and the peripheral level, with 39 health districts, each with a district hospital and a number of health centers. The total number of health centers in Rwanda is 365.

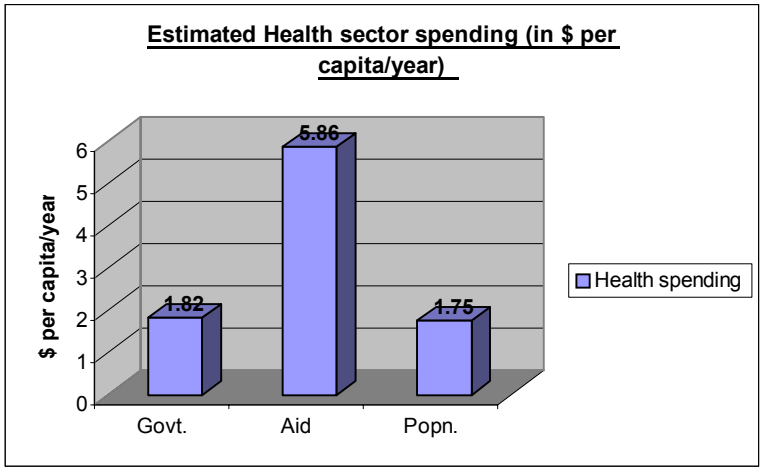
Rwanda's faith-based (Catholic, Protestant, Adventist, Muslim, other) health structure is well organized and quite large. In 2000, more than one third of all hospitals and health centers were faith-based.[15] Faith-based organizations are committed to following national health policies.

The private health sector, which comprised 329 medical "cabinets" in 1999, is steadily growing and offers an increasing range of services.

There are three major sources of health sector funding: the Government; multi- and bilateral donor agencies; the population. Government spending on health totaled $1.82 per person in 2003, representing 21% of the total resources in the sector. Donor support to the health sector in 2003 amounts to about $5.86 per inhabitant[16]. Bilateral, multilateral and non-governmental donors account for 69, 24.3 and 5.7 percent of total foreign aid respectively.

The Bamako Initiative was introduced in Rwanda in 1989, and before the 1994 genocide 68 percent of the health centers were practicing community participation and financing. The Bamako Initiative was reinstituted after the genocide and the emergency period. Today, the population contributes $0.5 per person per year via payments for health services. When spending to private sector service providers and pharmacies is included, the contribution is estimated to be between $1.5 and $2.0 per person per year (Figure 1).

Figure 1:



2.3.2 Policies

A national health policy, stating that decentralization, cost recovery and community participation are the essential cornerstones of the Rwandan health system, was adopted in 1995-1996. This policy was updated in 2001. Currently, there are eight disease control priority interventions – childhood diseases, epidemics, HIV/AIDS, malaria, mental health, non-communicable diseases, nutrition, and reproductive health. Information, education, and communication (IEC) and environmental protection are two important components to control disease.

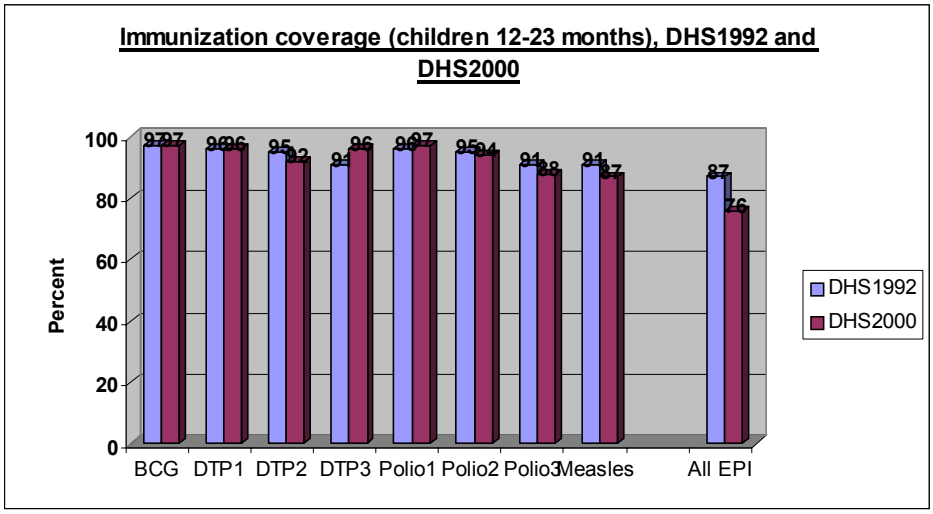
A National Reproductive Health Policy, addressing the key issues of safe motherhood/child health; family planning; adolescent reproductive health; prevention and treatment of STI/HIV/AIDS; prevention and treatment of sexual violence; and women's empowerment for decision making, was finalized in 2002.

2.3.3 Relevant Programs

Expanded Program on Immunization (EPI)

Rwanda has a very successful EPI program... As Figure 1 shows, immunization coverage has been maintained at a very high level since before the 1994 war.

Figure 1:



In contrast to those for vitamin A, the vaccine supply logistic system and the immunization monitoring system are both functioning well. Health Districts submit their monthly results in a complete and timely manner for two linked reasons: additional vaccines, necessary to meet strong community demand for immunization services, are supplied to the Districts only on submission of completed monitoring forms; and there is proactive follow-up and feedback from the central level to the peripheral level when monitoring forms are missing or contain missing or questionable data.

Program For Prevention of Mother-to-Child Transmission (PMTCT)

Nutrition has only just begun to be considered in national HIV/AIDS policies. In a country with such a high prevalence of HIV/AIDS and at the same time where breastfeeding is a common practice, it is very urgent to provide clear guidelines to frontline workers. A national program for the control of mother-to-child transmission (PMCTC) is now being implemented, and a draft infant and young child feeding policy is currently being finalized.

Reproductive Health

Fertility rates are high, and use of contraceptives decreased after the war (from 13 percent in 1992 to 4 percent in 2000). Maternal mortality is very high in Rwanda, 1,071 deaths/100,000 live births.

Although more than 90 percent of pregnant women have at least one antenatal consultation, this is mostly very late in pregnancy. Seventy-five percent of pregnant women deliver at home, and 69 percent without the help of a health worker. However, as evidenced by the

high BCG coverage rate (>90%), it appears that a high proportion of post partum women come to Health Centers, generally within 8 days after delivery (percentage is higher in rural than in urban areas).

Programme des Animateurs de Santé (PAS)

The National Health Animators Program, a social mobilization program for the prevention of infectious diseases, was established in 1995. Its mission is to promote health programs in the community in order to increase access and utilization of health services.

The health animators are volunteers and receive basic one-week training in health and nutrition. Currently, more than 13,000 health animators, of which about 50 percent are women, function throughout the country. Health animators have been involved in the implementation of NIDs, including the distribution of vitamin A capsules. Moreover, in some health districts, health animators are also involved in the PNBC.

Community Integrated Management of Childhood Illnesses (C-IMCI)

The integrated management of childhood illnesses strategy has only very recently been introduced in Rwanda. In general, this initiative aims to significantly reduce mortality and morbidity associated with the five major causes of disease in children under five and to contribute to their healthy growth and development. The IMCI strategy combines improved case management of childhood illness in first-level health facilities with aspects of nutrition, immunization, disease prevention, and promotion of growth and development.

2.4 Related Sectors

Ministry of Agriculture (MINAGRI)

The Ministry of Agriculture's mandate includes ensuring food security and an appropriate income to food producers, intensifying food production, and increasing cash crop production.

The Institut des Sciences Agronomiques (ISAR), the Rwandan institution responsible for agricultural research, has been conducting research and production trials of vitamin A-rich foods, one being the orange fleshed sweet potato. Results have been encouraging: same cultivation techniques as the white variety, early maturation, high yield, better taste. Promotional activities, including nutritional education, are planned.

Ministry of Education (MINEDUC)

In Rwanda, 75 percent of primary school-aged children are effectively in school. There is no gender difference in enrollment.

Currently, there are 2,177 functional primary schools. There is no school health program, but the World Food Program (WFP) is assisting 55 primary schools with a school feeding pro-

gram as well as providing a take-home ration for girls in grades 4 to 6. The foods provided are corn meal (fortified with vitamin A), vegetable oil (fortified with vitamin A) and beans. The Ministry of Education actively participated in the organization of the NIDs, with schools being used as vaccination sites and teachers being sensitized.

2.5 Contextual Issues

Health and Nutrition Infrastructure

The lack of human resources at all levels is mentioned as a serious problem by the Ministry of Health (MINISANTE).[17]

At the national level, nutrition is the responsibility of the Nutrition Division, located in the Direction of Health Care in the Ministry of Health (MINISANTE). The Nutrition Division is staffed by a five-member team, a Chief Nutritionist and four staff members, each responsible for a different area (nutritional rehabilitation, IEC, PNBC, young child feeding).

A nutritionist is assigned to each Health District, in most cases combining his/her work at the district hospital with supervisory tasks for the district. The district nutritionist is responsible for ensuring vitamin A reporting and for vitamin A supply logistics at the peripheral level.

At the Health Centre level, a staff member (not necessarily a nutritionist) is responsible for growth monitoring and promotion, vitamin A supplementation, and nutrition education activities. Volunteer community health and/or nutrition animators report to the Health Center regularly (the frequency of reporting is variable: daily in faith-based health centers, weekly or monthly in others).

HIV/AIDS

One of the most, if not the most, important public health problems in Rwanda is the high prevalence of HIV/AIDS, both in urban and rural populations. According to UNAIDS[18], HIV prevalence in the adult population is 11.2 percent. Among young adults of 15 to 24 years, prevalence is 9.08 - 12.23 percent for girls and 3.48 - 6.96 percent for boys. Nineteen percent of pregnant women in urban areas are HIV positive. Thirty-three percent of the health sector donor funds are spent to fight AIDS[19]

3. Conclusions

Vitamin A deficiency is a major cause of infant mortality. Experience increasingly shows that this deficiency in no small measure also increases maternal mortality. Vitamin A deficiency is a problem with potentially fatal consequences, whose elimination constitutes an essential element of child survival programs.

Vitamin A deficiency disorder is an important public health problem among Rwandan children under 5 and pregnant and lactating women. Until the last few years, vitamin A supplementation of children aged 6-59 months was carried out during National Immunization Days, and high coverage was achieved. NIDS effectively ended in Rwanda in 1999, however. Since then the Ministry of Health, with the support of UNICEF, has undertaken a number of efforts to try to keep a vitamin A program alive, including the development and dissemination of program directives and monitoring tools, and some vitamin A supplementation activities have been carried out through the routine health system and in the context of community-level pilot projects supported by various international NGOs and religious groups. In essence, though, in the absence of a national post-NIDS vitamin A strategy, Rwanda has not had a functional national vitamin A program for the past three years.

During the same period, Rwanda was able to:

- Launch a salt iodization program
- Increase the utilization rate for iodized salt to almost 100%
- Reduce the prevalence of goiter among school children from 49.6% to 25.9%

WHY THE DIFFERENCE?

Rwanda's own post-NIDS experience as well as that of other countries around the world has shown that the success and sustainability of vitamin A programs depends on a appreciation – among both the population and key decision-makers – of the importance of the problem and on the simplicity of the intervention(s) to resolve the problem.

In the case of iodine deficiency disorder both conditions were met. The existence and extent of the problem was both well-known and widely appreciated. The intervention chosen by the Government of Rwanda is both simple and effective – it mandated and is enforcing the importation of iodized salt.[20]

In the case of vitamin A deficiency disorder, however, neither condition has to date been met. For a variety of reasons, including the conclusions of the 1996 National Nutrition Survey Rwanda's decision-makers are not convinced that vitamin A deficiency is a priority public health problem. At the same time, the obviously pressing problem of HIV/AIDS has led these decision-makers to focus their attention elsewhere. What few resources are devoted to address the problem of vitamin A deficiency are dispersed among multiple programs, operating independently of and with little coordination among each other. And, compounding the problem is the fact that existing supplementation directives – for this, ordinarily the simplest

and most straightforward of the vitamin A interventions – have led to the development of service delivery and support systems that are complex and difficult to manage. The resulting system failure, reflected in the recent expiration of three million vitamin capsules, has created a loss of confidence among program managers, decision-makers, and donor agencies.

The assessment team believes that this situation can best be rectified by the adoption of a strategy that emphasizes doing a few effective things well

4. Recommendations

For the medium term, adopt preventive vitamin A supplementation of children aged 6-59 months and post-partum women as the principal interventions

At the same time, expand the cultivation and promotion of the orange-fleshed sweet potato and other foods equally rich in β-carotene already available and locally consumed, as a key element in a long-term dietary diversification effort

Supplementation is not only the most effective vitamin A deficiency intervention but also the intervention that can most rapidly be implemented nationwide. The fact that supplementation can achieve rapid success in addressing vitamin A deficiency does not mean that supplementation is a short term strategy, however. In countries with clinical vitamin A deficiency, it can take up to 15-20 years to successfully replace universal high-dose vitamin A supplementation program with food fortification programs and improvement in dietary practices[21].

Preventive vitamin A supplementation of children 6-59 months

Reduce the frequency of supplementation from every four months to every six months

Distribute capsules nationwide during two specific periods each year through community-based programs – PNBC and PAS

While Rwanda's current recommended frequency of supplementation falls within the WHO guidelines of every four to six months, it is, unnecessarily, at the upper limit of the range. The assessment team advises that Rwanda adopt the lower limit of the range, every six months, as its recommended frequency.

The task of determining eligibility for and delivering capsules on an individual basis is an arduous one even for the most robust health system. The assessment team therefore suggests that vitamin A capsule distribution be limited to two specific time periods each year, during each of which ALL children aged 6 to 59 months will receive a vitamin A dose according to the internationally adopted regimen[22].

AGE GROUP	VITAMIN A DOSE
Children 6 to 11 months	100,000 IU
Children 12 to 59 months	200,000 IU

The assessment team suggests that capsule distribution take place in the context of two ongoing community-based health sector programs – the PNBC and the PAS – as well as in the Health Centers. The assessment team envisions that, ultimately, the PNBC will serve as the primary focal point for vitamin A distribution, with two of its 12 monthly sessions focusing on vitamin A. While the program is currently operative in only 15 of the country's 39 districts, expansion of the program is not only planned but may also accelerate under the impetus of an impending distribution.

While the specific roles and responsibilities of all concerned partners cannot be detailed at this time, the assessment team envisions that UNICEF will collaborate with the Ministry of Health's Nutrition Division and the EPI program to ensure adequate and timely capsule supply at the central level; that the EPI program will ensure the supply of capsules at the peripheral level; and that Health Centers will ensure capsule supply to the PAS and PNBC sites. The Nutrition Division will be responsible for developing supplementation guidelines, training manuals, IEC materials and monitoring tools. Some examples of monitoring tools used in other countries are provided in Appendix D.

One of the benefits of routine bi-annual distribution rather than distribution "on demand" is the ability to easily calculate coverage rates. Currently, only the absolute number of children receiving a capsule in the month is reported. While bi-annual distribution makes an effective monitoring system possible, such a system will only work in practice if demand is created for vitamin A at the grass roots level. An important lesson learned from Rwanda's successful immunization program is that the population is very aware of the importance of child immunization, so much so that Health Centers are under considerable pressure from the community to never allow a rupture in the supply of vaccines. At the same time, the Centers are under intense pressure from the top to submit complete and timely monitoring reports as a precondition for re-supplying vaccines.

While creating some complexity, a Health Center-based catch-up system may serve to ensure vitamin A coverage at the 80 percent level needed to ensure an effective reduction of vitamin A deficiency. Such a system would entail the administration of a vitamin A capsule "on the spot" at the time of measles vaccination at 9 months for children not previously supplemented.

Preventive vitamin A supplementation of post-partum women

Maternal supplementation with a high dose of vitamin A at the time of delivery and the promotion of optimal breastfeeding practices are highly effective strategies for improving vitamin A nutrition in infants and should be strengthened as key components of comprehensive child survival programs[23] Vitamin A is also known to be useful for women whether or not they breastfeed their infants.

Administer one 200,000 IU vitamin A capsule to post-partum women at the time of the BCG vaccination of their infants (ideally at birth or, in any event, no later than eight weeks after delivery)

Although the majority of women deliver at home, the assessment team believes that Rwanda's very high BCG immunization rate of 97 percent makes it likely that a Health Center-based strategy will achieve high post-partum vitamin A supplementation coverage. A catch-up system, linked to DPT1 vaccination at six week after delivery, is needed to take into account the fact that post-partum mothers may not themselves bring their infants for BCG vaccination if this occurs very soon (within eight days) after delivery.

As with the preventive supplementation of children, the PNBC and PAS will play important roles in post partum vitamin A supplementation, this in the area of demand creation.

The assessment team is aware that there remain important questions to be answered on the role of maternal vitamin A supplementation and transmission of HIV infection to the infant. "Data on the role of maternal vitamin A supplementation and transmission of HIV infection to the infant [presented at the February 2003 meeting of the International Vitamin A Consultative Group (IVACG)] were contradictory"[24], and IVACG's Secretariat noted that "the impact of infections, i.e., HIV, malaria, and tuberculosis, along with micronutrient interactions are the key future research areas for scientists interested in vitamin A deficiency disorders"[25]. In Rwanda, the development of clear breastfeeding policies and feeding guidelines is a clear priority.

Dietary diversification

Expand the cultivation and promotion of the orange-fleshed sweet potato and other locally available vitamin A- rich fruits and vegetables as a way of improving the dietary intake of β-carotene

In many developing countries, provitamin A carotenoids are the major source of dietary vitamin A, with plant sources providing more than 80 percent of the total vitamin A intake. Intervention studies have shown that leafy vegetables and carrots improve vitamin A status, but not as much as previously thought. Fruits, including pumpkin and sweet potato, improve vitamin A status more than vegetables. This, the lower bioavailability of vitamin A in vegetables and fruits, and probably also the seasonal variability of production of vegetables and fruits in home gardens, are factors underlying the causes of vitamin A deficiency in these regions[26].

The bioavailability and bioconversion of provitamin A carotenoids are affected by a number of factors, including: the chemical form of the carotenoid; its location within the food matrix; the size of the food particles eaten; food preparation practices that disrupt the food matrix to different degrees; the amount of carotenoids in a meal; the presence of other food components such as fiber that inhibit carotenoid absorption; the presence both of dietary fat, which enhances absorption, and of bile salts and pancreatic enzymes in the intestinal lumen, which enhance digestion; and the nutritional status of the individual. For example, the bioavailability of β-carotene from a mixed-vegetable diet relative to purified β-carotene is about 14 percent, whereas that from green leafy vegetables is 5-10 percent and that from carrots is 20-30 percent. It is recommended that, to maximize the benefits of the bioavailability and bioconversion of provitamin A carotenoids, households should be encouraged to eat provitamin A

carotenoid-rich fruits, pumpkins, and orange-fleshed sweet potatoes because the β-carotene in these foods is more readily released than that in other vegetables[27].

The strong interest of the Government of Rwanda and its partners in food based strategies (food production, dietary diversification, promotion) is reflected in Rwanda's draft nutrition policy documents. At the same time, trials of the cultivation of orange-fleshed sweet potatoes have proven to be promising (same cultivation practices, high yield, better taste). Because sweet potatoes are the most important staple food in the Rwandan diet, introducing a new β-carotene rich orange-fleshed variety will not require a profound change in dietary habits. Orange-fleshed sweet potatoes have a β-carotene content on average of 550 µg RE/100 gr.. Their leaves (which can be eaten raw or in a sauce) contain 600 µg RE/100 gr.[28]. A child would need to eat about one cup of leaves or half a potato per day to satisfy its vitamin A requirements (See Appendix F for technical details).

Food Fortification

Do not exclude food fortification as a long-term strategy, but concentrate efforts on supplementation in the medium-term

Fortification has been shown to be an effective dietary intervention strategy which requires low investment since it can be built on existing technology. Yet, finding an ideal food vehicle continues to be a challenge. The food must be consumed by a large part of the target population at quantities that do not vary greatly day by day; it has to be produced and processed by a small number of manufacturers and it must be monitored easily (through tracking of marketing and distribution channels).

Except for sugar, Rwanda has no widely-consumed centrally-produced food products. Rwanda imports a number of processed foods from neighboring countries and might, therefore, benefit greatly from regional fortification efforts.

5. Implementation Issues and Next Steps

Two factors are, in general, crucial in determining the ultimate success of a program to control vitamin A deficiency. Each of these factors is relevant in Rwanda, and the assessment team has developed its suggestions regarding immediate next steps on this basis.

Government commitment to address the problem

Vitamin A deficiency control is not yet fully on the agenda of the Government of Rwanda. To date, attention to the problem has been largely donor-driven. Moving the problem of vitamin A deficiency into its warranted position as a national priority will likely require a concerted effort to carefully consider solid evidence on its existence, extent, and nature in consultation with partners.

The assessment team suggests that Rwanda initiate a comprehensive awareness building effort by undertaking a PROFILES exercise in the near future. PROFILES is a process designed to:

- translate technical nutrition data and analyses into terms and arguments that make sense to non-experts.
- influence the way policy-makers think about public health nutrition issues, and the priority they give to investing in nutrition programs.
- estimate the costs, effectiveness, and benefits of nutrition programs. Cost: benefit and cost: effectiveness analyses are used to set priorities, assess the affordability of proposed interventions, compare alternative programs, and allocate resources effectively.
- use interactive computer-based models to project the consequences of poor nutrition on mortality, morbidity, health care costs, worker productivity, mental development, fertility, and other parameters.

PROFILES is a tool used in a larger process of policy analysis and advocacy. The overall process usually involves the active participation of country level nutritionists and advocates in defining the issues, gathering the necessary nutrition data, agreeing on the model coefficients and assumptions, running the PROFILES simulations and finally formulating the arguments in the most effective and convincing manner[29].

It may also be useful to review the data from the 1996 National Nutrition Survey to determine whether the confidence intervals are sufficiently large to affect the conclusions drawn regarding the existence of a vitamin A deficiency problem.

Effective service delivery

Government and donor commitment will be sustained in the long-term to the extent that vitamin A deficiency activities are not only accepted by but demanded by the community.

While community demand for services can be created through a variety of demand creation activities, such demand will not last very long in the face of ineffective service delivery.

Effective service delivery requires, first and foremost, clear policies and strategies, and the assessment team recommends the timely revision of the national nutrition policy and the development of a national vitamin A strategy. Effective service delivery also requires the "translation" of policies and strategies into simple activities that field workers can successfully implement. A number of similar and/or neighboring countries have successfully developed and implemented vitamin A interventions similar to those suggested in this report (MOST/Uganda has successfully implemented a project to promote cultivation and consumption of the orange-fleshed sweet potato; successful post-NIDS vitamin A supplementation projects are being implemented in a number of francophone African countries), and the assessment team suggests that Rwanda consider organizing study tours to these countries. A number of training tools are also provided in Appendix C to this report. Finally, effective service delivery depends on the rigorous monitoring and evaluation of service delivery processes and results. A number of examples of monitoring and evaluation tools are provided in Appendix E to this report.

[1] UNICEF, 2000, State of the World's Children
[2] USAID/Rwanda, 2002, FY 2002 Annual Report
[3] République Rwandaise, 1995, Politique Nationale et Plan National d'Action de Nutrition
[4] Although the only national survey providing data on VAD, the 1996 National Nutrition Survey conducted by the Tanzania Food and Nutrition Centre, concluded that VAD is not a major problem in Rwanda, the sizes of the samples of children and pregnant women for whom serum retinol levels were determined are extremely small (n=423 and n=161 respectively), making it prudent to use the survey's VAD results with caution. Additionally, analyses conducted by Aguayo and Baker (Aguayo, V., Baker, S. The potential contribution of Vitamin A deficiency control to child survival in sub-Saharan Africa. IVACG 2003 Abstract) indicate a severe under-estimation of the degree of vitamin A deficiency in sub-Saharan Africa.
[5] ONAPO, USAID, ORC Macro, 2000, Demographic and Health Survey of Rwanda. Note, however, that only 4 percent of women reported having trouble with their vision during the night but not during the day. While this figure corrects for vision problems in general, it may slightly underestimate the rate of night blindness.
[6] IVACG, 2002, The Annecy Accords to Assess and Control VAD: Summary of Recommendations and Clarifications
[7] Mahy, L., 1989, La vulgarisation et aspects nutritionnels de Limnothrissa miodon. Projet RWA/87/012, Gisenyi. RWA/87/012/DOC/TR/16
[8] ONAPO, USAID, ORC Macro, 2000, Rwanda 2000: Nutrition of Young Children and Mothers
[9] République Rwandaise, 1995, Politique Nationale et Plan National d'Action de Nutrition
[10] It was reported to the assessment team that the FAO is interested in assisting in the revision of the National Nutrition Policy and Plan of Action.
[11] République Rwandaise, Ministry of Health, 2001, Health Sector Situation Analysis (draft)
[12] République Rwandaise, Ministère de la Santé, UNICEF, 2002, Protocole de mise en oeuvre du programme de nutrition à base communautaire (PNBC) (draft)
[13] Save the Children Fund, 2003, Thin on the Ground: Questioning the Evidence Behind World Bank-Funded Community Nutrition Projects in Bangladesh, Ethiopia, and Uganda
[14] The assessment team noted that international NGOs were not aware that vitamin A capsules are available in Rwanda free of charge and are to be requisitioned from the Nutrition Division.
[15] République Rwandaise, Ministry of Health, 2001, Health Sector Situation Analysis (draft)
[16] République Rwandaise, Ministry of Health, 2003, Donor Support and Intervention in the Health Sector
[17] République Rwandaise, Ministry of Health, 2001, Health Sector Situation Analysis (draft)
[18] UNAIDS, 2000, Rapport sur l'Epidémie mondiale du VIH/SIDA. Tableau des estimations et données relatives au VIH/SIDA par pays, pages 124-129
[19] République Rwandaise, Ministry of Health, 2003, Donor Support and Intervention in the Health Sector
[20] Although salt is consumed by the majority of households, no salt is produced locally.
[21] Underwood, B., 1998, Prevention of VAD (Chapter 4 IOM document on Prevention of Micronutrient deficiencies: tools for policy makers)
[22] WHO/UNICEF/IVACG, 1997, Vitamin A Supplements: A Guide to Their Use in the Treatment and Prevention of Vitamin A Deficiency and Xerophalmia. Second edition prepared by WHO/UNICEF/IVACG Task Force. WHO, Geneva, Switzerland.
[23] Ross, J.S. and Harvey, P.W.J., February 2003, Contribution of Breastfeeding to Vitamin A Nutrition of Infants: A Simulation Model, *Bulletin of the World Health Organization*
[24] IVACG, 2003, Press Release: Improving the Vitamin A Status of Populations Focus of XXI IVACG Meeting – 3-5 February 2003 – Marrakech, Morocco
[25] IVACG, Press Release: Improving the Vitamin A Status of Populations Focus of XXI IVACG Meeting – 3-5 February 2003 – Marrakech, Morocco. 2003
[26] Bloem M, *et al,* 1998, New Issues in Developing Effective Approaches for the Prevention and Control of Vitamin A Deficiency, *Food and Nutrition Bulletin,* vol. 19, no. 2, 1998, The United Nations University.
[27] Nestel P., Nalubola R., 2003, The Amount and Bioavailability of Provitamin A Carotenoids in Plant Foods Vary Widely, *Micronutrient Fact Sheets*, ILSI
[28] IRD, WHO, 2001, Nutrition, Santé et Developpement Produits végétaux riches en carotènes WHO/NHD/01.6
[29] Academy for Educational Development, 2003, PROFILES: Computer Software for Nutrition Policy Analysis and Advocacy